Ontario

Apprenticeship Training Standards

Industrial Mechanic (Millwright)

Ministry of Training,
Colleges and Universities

Ministry of Training,
Colleges and Universities

Apprenticeship Training Standards

Industrial Mechanic (Millwright)

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This document is the property of the apprentice named inside and represents the official record of his/her training

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PREFACE

The Workplace Support Services Branch of the Ministry of Training, Colleges and Universities (MTCU) developed this training document in consultation with representatives from the industry. These Training Standards are intended to be used by apprentice, instructors and companies as a "blueprint" for training or as a prerequisite for government accreditation/ certification.

The care and maintenance of this book are the joint responsibility of the apprentice and the sponsor. The Training Standards were developed specifically for documenting the apprentice's acquisition of skills.

The book becomes the only record of an apprentice's training.

IMPORTANT DIRECTIONS TO SPONSORS AND TRAINERS

Training Standards identify skills required for this occupation and its related training program.

These Training Standards have been written in concise statements that describe how well an apprentice must perform each skill to become competent.

In using these Training Standards, sponsors will be able to ensure that the apprentice is developing skills detailed for the occupation.

Trainers and apprentices are required to sign off and date the skills following each successful acquisition.

Sponsors participating in this training program are required to attest to achievement by signing the appropriate box included at the end of each unit. Sponsors should only sign off each skill set once the apprentice has demonstrated competency in each of the unshaded skills within that unit. Unless a skill is shaded, it must be signed off in order for the apprentice to complete this apprenticeship program.

INDUSTRIAL MECHANIC (MILLWRIGHT)

IMPORTANT DIRECTIONS TO THE APPRENTICE

Apprentice

1. All hours working for each sponsor(s) should be recorded in the Sponsor Information section.

2. The "Summary of Hours" should be completed, signed and dated by both the apprentice and sponsor when either all terms of the training agreement have been completed or the apprentice leaves the sponsor.

3. It is the responsibility of the apprentice to inform the local Apprenticeship Client Services office regarding the following changes:

   - Change of sponsor address;
   - Change of apprentice name or address;
   - Transfer to a new sponsor.

4. At the fulfillment of all terms of the Training Agreement, the Apprentice Completion Form must be completed and signed by the current sponsor. Present these completed and authorized Training Standards and the Apprentice Completion Form to your local Apprenticeship Client Services office.

5. In order for an apprentice to complete the on the job training portion of the Industrial Mechanic Millwright apprenticeship program, all unshaded skills sets must be signed off by a ministry approved sponsor.

NOTICE/DECLARATION FOR COLLECTION OF PERSONAL INFORMATION

1. This information is collected under the authority of the *Apprenticeship and Certification Act*, 1998.

2. The information is collected for the purpose of administering this apprenticeship program within the Province of Ontario.

3. Questions regarding collection and use of this information may be directed to:

   Director of Apprenticeship
   Workplace Support Services Branch
   Ministry of Training, Colleges and Universities
   17th Floor, Mowat Block
   900 Bay Street
   Toronto, Ontario
   M7A 1L2
   (416) 326-5605

APPRENTICE RECORD

Apprentice Name: _____

Training Agreement Number: _____
(If applicable)

SPONSOR INFORMATION

Name: _____

Address: _____

_____

Telephone: _____

SUMMARY OF HOURS:

Dates of Employment: _____ _____
From To

Total hours of Training and Instruction between dates of Employment _____ Hours

_____	_____	_____	_____
Sponsor's Signature	Date	Apprentice Signature	Date

SPONSOR INFORMATION

Name: _____

Address: _____

_____

Telephone: _____

SUMMARY OF HOURS:

Dates of Employment: _____ From _____ To

Total hours of Training and Instruction between dates of Employment _____ Hours

_____ Sponsor's Signature _____ Date _____ Apprentice Signature _____ Date

---

SPONSOR INFORMATION

Name: _____

Address: _____

_____

Telephone: _____

SUMMARY OF HOURS:

Dates of Employment: _____ From _____ To

Total hours of Training and Instruction between dates of Employment _____ Hours

_____ Sponsor's Signature _____ Date _____ Apprentice Signature _____ Date

SPONSOR INFORMATION

Name: _____

Address: _____

_____

Telephone: _____

SUMMARY OF HOURS:

Dates of Employment: _____ _____
From To

Total hours of Training and Instruction between dates of Employment _____ Hours

_____	_____	_____	_____
Sponsor's Signature	Date	Apprentice Signature	Date

SPONSOR INFORMATION

Name: _____

Address: _____

_____

Telephone: _____

SUMMARY OF HOURS:

Dates of Employment: _____ _____
From To

Total hours of Training and Instruction between dates of Employment _____ Hours

_____	_____	_____	_____
Sponsor's Signature	Date	Apprentice Signature	Date

APPRENTICE COMPLETION FORM

Apprentice Name _____
Print

_____
Signature

Social Insurance Number _____

Skill Sets when completed should be Signed off by the Sponsor on the following page and presented with this completion form to your local Apprenticeship Client Services office. Any supporting documentation should also be attached.

In-School Completed: (proof to be provided) Yes ( ) No ( ) Not Applicable ( )

Hours completed as per Program Guidelines Yes ( ) No ( ) Not Applicable ( )

Sponsor Name: _____

Address: _____

Telephone: _____

Sponsor: _____
Signature

MTCU USE ONLY:

Recommended for Exam: Yes ( ) No ( )

_____ _____
Signature Consultant/Office Code

TRAINING SUMMARY FORM

SKILL SET	TITLE	SIGNATURE
U4600	Protect Self and Others	_____
U4601	Communicate	_____
U4602	Read Drawings and Schematics	_____
U4603	Hand and Power Tools	_____
U4604	Set up and Use Machine Tools	_____
U4605	Use and Care of Precision Measuring Equipment	_____
U4606	Select and Use Material and Fasteners	_____
U4607	Select and Apply Lubricants	_____
U4608	Rig and Hoist	_____
U4609	Install and Maintain Material Handling Systems	_____
U4610	Install and Maintain Power Transmission Systems	_____
U4611	Install and Maintain Compressors	_____
U4612	Install and Maintain Pumps	_____
U4613	Install, Commission and Maintain Prime Movers and Machinery	_____
U4614	Weld, Braze and Solder	_____
U4615	Install and Maintain Bearings, Seals and Packing	_____
U4616	Install and Maintain Fans and Blowers	_____
U4617	Install and Maintain Pneumatic Systems	_____
U4618	Install and Maintain Hydraulic Systems	_____
U4619	Perform Preventive and Predictive Maintenance	_____

U4600.0 PROTECT SELF AND OTHERS

SKILL SET

Protect self and others by: complying with safety legislation and company policy; wearing and maintaining safety clothing and equipment; reporting all hazards; applying basic first aid; applying confined space safety procedures; applying machinery and equipment lock-out procedures; using correct body mechanics when lifting loads; communicating with fellow workers; reporting all accidents and respond to emergency situations.

Trainer/Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4600.01 ***Comply with all safety legislation, government regulations and company policies*** when installing, troubleshooting and maintaining industrial equipment.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.02 ***Apply all machinery and equipment lock-out and de-energizing procedures***, mechanical, electrical, hydraulic and pneumatic, before commencing maintenance and overhaul procedures in accordance with government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.03 ***Wear safety clothing and equipment*** required for work to be performed, ensuring correct fit and demonstrating proper care and use, in accordance with government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.04 ***Comply with established confined space safety procedures*** including the use of breathing apparatus, before commencing and during work in accordance with government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.0 PROTECT SELF AND OTHERS - Cont'd

SKILLS

U4600.05 ***Apply basic first aid*** to self and others and seek immediate assistance in emergency situations in accordance with government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.06 ***Prevent fires*** by determining the potential for fire posed by the work performed and obtaining the required fire prevention and fire fighting equipment.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.07 ***Report all hazards and accidents*** to co-workers and supervisory personnel, and complete all necessary paper work in accordance with government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.08 ***Perform all work in compliance with company safety and housekeeping standards*** including use of protective barriers and guards to ensure the safety of self and others.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4600.09 ***Apply correct body mechanics***, when bending, lifting or moving heavy loads.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4601.0 COMMUNICATE

SKILL SET

Give and receive oral and written instructions; read technical literature and manufacturer's specifications; write technical and environmental reports; write maintenance and job reports to company requirements; use computer and job maintenance software for specific applications.

Trainer/Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4601.01 ***Liaise and communicate with fellow workers, company representatives*** and other trades, to convey information and promote trade competency.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4601.02 ***Write overall maintenance and job specific reports*** in accordance with company policies and job requirements.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4601.03 ***Use computer and job specific maintenance software packages.***

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4601.04 ***Write technical reports***, paying particular attention where required, to environmental hazard procedures and regulations.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print) _____ **Sponsor Signature** _____

U4601.0 COMMUNICATE

SKILL SET

Give and receive oral and written instructions; read technical literature and manufacturer's specifications; write technical and environmental reports; write maintenance and job reports to company requirements; use computer and job maintenance software for specific applications.

Trainer/Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4601.01 ***Liaise and communicate with fellow workers, company representatives*** and other trades, to convey information and promote trade competency.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4601.02 ***Write overall maintenance and job specific reports*** in accordance with company policies and job requirements.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4601.03 ***Use computer and job specific maintenance software packages.***

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4601.04 ***Write technical reports***, paying particular attention where required, to environmental hazard procedures and regulations.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

Sponsor Name (print) _____ **Sponsor Signature** _____

U4602.0 READ DRAWINGS AND SCHEMATICS

SKILL SET

Read drawings and schematics; interpret manufacturer's manuals, specifications, and drawing symbols; draw and sketch using orthographic, isometric and sectional views; read and interpret schematic and logic diagrams, ensuring compliance with standards and specifications when installing and maintaining machinery and equipment.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4602.01 ***Read and interpret engineering, machine and component drawings*** and symbols when overhauling and assembling machinery and equipment.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4602.02 ***Draw assembly and component parts*** using orthographic, isometric and sectional views, using equipment such as drafting tables or computer aided drafting, adhering to relevant dimensions and notes.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4602.03 ***Read and interpret reports, technical and manufacturer's manuals***, when overhauling machinery and updating equipment, in accordance with government regulations and company policy.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4602.04 ***Read and interpret schematics and diagrams*** when assembling, maintaining and repairing, and troubleshooting fluid power systems to specifications.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4602.0 READ DRAWINGS AND SCHEMATICS

SKILL SET

Read drawings and schematics; interpret manufacturer's manuals, specifications, and drawing symbols; draw and sketch using orthographic, isometric and sectional views; read and interpret schematic and logic diagrams, ensuring compliance with standards and specifications when installing and maintaining machinery and equipment.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4602.01 ***Read and interpret engineering, machine and component drawings*** and symbols when overhauling and assembling machinery and equipment.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4602.02 ***Draw assembly and component parts*** using orthographic, isometric and sectional views, using equipment such as drafting tables or computer aided drafting, adhering to relevant dimensions and notes.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4602.03 ***Read and interpret reports, technical and manufacturer's manuals***, when overhauling machinery and updating equipment, in accordance with government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4602.04 ***Read and interpret schematics and diagrams*** when assembling, maintaining and repairing, and troubleshooting fluid power systems to specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4602.0 READ DRAWINGS AND SCHEMATICS - Cont'd

SKILLS

U4602.05 ***Sketch (free hand) assembly and component parts***, using relevant dimensions and notes so that sketches can be interpreted and parts produced by other tradespersons.

Sponsor Name (print) **Sponsor Signature**

_____ _____

U4603.0 HAND AND POWER TOOLS

SKILL SET

Use hand and power tools such as: sockets, spanners, wrenches, screwdrivers, hammers, chisels, punches, pliers, scrapers, drills, taps, reamers, dies, squares, tapes, snips, saws, tube and pipe benders, chippers, power jacks, portable seating and lapping equipment, threading machines, shears, magnetic drills, hand millers, power saws and impact tools to assemble, install and maintain machinery and equipment to manufacturer's specifications.

	Trainer\Supervisor Name (print)	Apprentice Name (print)
SKILLS	_____	_____

U4603.01 ***Use sockets, spanners, wrenches, torque multipliers, manual and\or hydraulic torque wrenches***, when installing, maintaining and repairing machinery, adhering to established bolt tightening sequences, in accordance with manufacturers specifications, torque and tensioning charts and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4603.02 ***Use screwdrivers, chisels, hammers, punches, pliers, levers, scrapers, and pry bars*** in a safe and efficient manner when installing, maintaining and repairing machinery to manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4603.03 ***Use files, hand saws, drills, power sanders and chippers, reamers, taps, tapping chucks, dies and snips*** to manufacture and shape components in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4603.0 HAND AND POWER TOOLS - Cont'd

SKILLS

U4603.04 ***Use tapes, rules, plumb bob and squares*** when measuring and aligning components in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4603.05 ***Use shears, magnetic base drills, grinders and hand millers*** in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4603.06 ***Use power saws, impact tools, and\or powder actuated tools safely***, efficiently and in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4604.0 SET UP AND USE MACHINE TOOLS

SKILL SET

Set up and use machine tools by: using charts and cutting speed tables; applying trade calculations and formulas; setting and operating lathe, milling machine, pedestal and radial drill, surface grinders, cut-off and band saw, hydraulic press, shears and machine tool accessories, in accordance with prescribed tolerances and specifications.

	Trainer\Supervisor Name (print)	Apprentice Name (print)
SKILLS	_____	_____

U4604.01 ***Read and apply feed, speed, thread cutting, drill and tap chart information*** and specifications for a variety of machine tool operations, calculating and applying imperial/metric conversions as required.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.02 ***Apply specific trade calculations and formulas*** when machining, fitting, setting up, laying out, aligning and establishing gear ratios, ensuring compliance with engineering drawings and manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.03 ***Set up and operate pedestal and radial drilling machines*** using clamps, vices, jigs, and angle plates, to drill, ream, tap, countersink and bore; by using high speed steel (H.S.S.), carbide drills and reamers, to job specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.04 ***Set up and operate cut-off and band saws*** using material specific blades, feeds, speeds and coolants by cleaning, cutting and preparing band saw blades for welding using welding attachments; by setting up and operating hydraulic press; by setting up and operating equipment to crop, notch, bend, shear and roll material in accordance with drawing specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.0 SET UP AND USE MACHINE TOOLS - Cont'd

SKILLS

U4604.05 ***Set up and perform lathe operations*** such as turning, boring, facing, threading, cutting tapers, knurling, grinding, and forming, by cutting using high speed steel (H.S.S.) and carbide tool bits and by machining to within plus or minus .002" or within prescribed tolerances and specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.06 ***Set up and perform milling operations*** such as slotting, facing, boring, and cutting keyways by using high speed steel (H.S.S.) and carbide tool bits and by machining to within plus or minus .002" or within prescribed tolerances and specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.07 ***Set up and operate machine tool accessories***, such as dividing heads, taper turning attachments, 3 and U4 jaw chucks, magnetic chucks, face plates, surface grinders, wheel dressing attachments and drill and tool sharpening attachments, in accordance with drawing specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4604.0 SET UP AND USE MACHINE TOOLS - Cont'd

SKILLS

U4604.05 ***Set up and perform lathe operations*** such as turning, boring, facing, threading, cutting tapers, knurling, grinding, and forming, by cutting using high speed steel (H.S.S.) and carbide tool bits and by machining to within plus or minus .002" or within prescribed tolerances and specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.06 ***Set up and perform milling operations*** such as slotting, facing, boring, and cutting keyways by using high speed steel (H.S.S.) and carbide tool bits and by machining to within plus or minus .002" or within prescribed tolerances and specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4604.07 ***Set up and operate machine tool accessories***, such as dividing heads, taper turning attachments, 3 and U4 jaw chucks, magnetic chucks, face plates, surface grinders, wheel dressing attachments and drill and tool sharpening attachments, in accordance with drawing specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4605.0 USE AND CARE OF PRECISION MEASURING EQUIPMENT

SKILL SET

Use and care of precision measuring equipment by: caring and using of all precision measuring and alignment equipment and instruments when measuring, moving, setting up, and maintaining, machinery to manufacturer's specifications and prescribed tolerances.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4605.01 ***Use and care of internal and external micrometers*** including minor adjustments and calibration, by taking linear measurements and reading measurements in imperial and metric S.I., accurately to within plus or minus .0005" or the metric equivalent.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.02 ***Use and care of vernier***, by taking inside and outside measurements to an accuracy of plus or minus .001", transferring linear measurements using vernier and vernier height gauge to an accuracy of plus or minus .001", and reading caliper to an accuracy of plus or minus .001".

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.03 ***Use and care of dial indicators and computer dials***, by setting up dial indicators using 2 dial set-up and reverse dialling, using instruments to align couplings, and using precision and master levels to prescribed tolerances.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.04 ***Use and care of V-blocks, gauge blocks, and surface plates*** for laying out, angle solving, verifying accuracy, comparing and transferring measurements.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.0 USE AND CARE OF PRECISION MEASURING EQUIPMENT - Cont'd

SKILLS

U4605.05 ***Care and set up of machine optical levels***, such as dumpy or automatic, for levelling and elevation transfer, using tilting precision level for levelling of equipment to an accuracy of plus or minus .001".

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.06 ***Use and care of laser alignment equipment*** for levelling and alignment to prescribed standards.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.07 ***Use measuring and testing instruments and equipment*** including voltmeters, ammeters and megameters, according to diagnostic inspection of control systems.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.08 ***Define bench marks and turning point***, by using rods, tapes and precision scales, applying transits for transferring lines and turning angles including horizontal and vertical, to specifications in degrees, minutes and seconds.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4605.0 USE AND CARE OF PRECISION MEASURING EQUIPMENT - Cont'd

SKILLS

U4605.05 ***Care and set up of machine optical levels***, such as dumpy or automatic, for levelling and elevation transfer, using tilting precision level for levelling of equipment to an accuracy of plus or minus .001".

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.06 ***Use and care of laser alignment equipment*** for levelling and alignment to prescribed standards.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.07 ***Use measuring and testing instruments and equipment*** including voltmeters, ammeters and megameters, according to diagnostic inspection of control systems.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4605.08 ***Define bench marks and turning point***, by using rods, tapes and precision scales, applying transits for transferring lines and turning angles including horizontal and vertical, to specifications in degrees, minutes and seconds.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4606.0 SELECT AND USE MATERIALS AND FASTENERS

SKILL SET

Identification and use of ferrous and non-ferrous metals, alloys and non-metallic materials; heat treat and stress relieve material to requirements; use thread systems for specific applications; use nuts, bolts, screws, dowels and chemical fasteners as required and to specifications.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4606.01 ***Identify and use ferrous, non-ferrous and specialty alloy materials***, including stainless steel, to manufacture engineering components from drawings and sketches.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4606.02 ***Select and use non-metallic materials*** such as nylon, rubber and plastic to manufacture components from drawings and sketches, by using specialized tools to lay out, cut or machine non-metallic materials to manufacturers specifications.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4606.03 ***Identify, select and apply screw thread system,*** by selecting from Unified, American, National, Acme, Metric and Pipe thread systems, single or multi start and left or right hand, in accordance with manufacturers specifications.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4606.04 ***Identify, select and use fastening devices***, such as bolts, nuts, screws, dowels, rivets, circlips and chemical fasteners, in accordance with manufacturers specifications, drawings and company policy.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4606.0 SELECT AND USE MATERIALS AND FASTENERS - Cont'd

SKILLS

U4606.05 ***Use furnace, flame or oven to heat treat metal and alloys***, by observing colour changes, using colour charts, and air, oil and water cooling medium for specific application, in accordance with manufacturers specifications, drawings and company policy

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4606.06 ***Stress relieve steel***, by heating material to required temperature, and allowing to slow cool in air, and checking dimensions of component after stress relieving, in accordance with job specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4606.0 SELECT AND USE MATERIALS AND FASTENERS - Cont'd

SKILLS

U4606.05 ***Use furnace, flame or oven to heat treat metal and alloys***, by observing colour changes, using colour charts, and air, oil and water cooling medium for specific application, in accordance with manufacturers specifications, drawings and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4606.06 ***Stress relieve steel***, by heating material to required temperature, and allowing to slow cool in air, and checking dimensions of component after stress relieving, in accordance with job specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4607.0 SELECT AND APPLY LUBRICANTS

SKILL SET

Select and apply lubricants and greases for specific applications; identify characteristics of lubricants; select and use oils and greases to manufacturer's specifications; select and use special purpose lubricants; install and maintain manual and automatic lubrication systems; handle and store lubricants safely, and maintain record system.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4607.01 ***Identify characteristics and composition of various lubricants*** from charts and standards and apply for specific applications and conditions, ensuring compliance with manufacturer's recommendations.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4607.02 ***Select and use specific oils and greases*** to reduce friction, wear, and to cool moving parts, and preventing corrosion and seal out dirt and other contaminants, in accordance with manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4607.03 ***Identify, select and use special purpose lubricants*** for extremely high or low temperature applications, extreme pressure (E.P.) and high load applications, in accordance with manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4607.04 ***Install, maintain and repair machinery and plant lubrication systems***, such as pumps, flow indicators, spray valves, metering and dispensing equipment, laying out all piping and fittings, in accordance with drawings and manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4607.0 SELECT AND APPLY LUBRICANTS - Cont'd

SKILLS

U4607.05 ***Handle and store all lubricants and greases safely***, in compliance with safety and environmental legislation according to company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4608.0 RIG AND HOIST

SKILL SET

Plan lifts; perform calculations using load charts; select and use correct rigging/hoisting equipment; inspect and maintain rigging/hoisting equipment; use hand and radio signals.

	Trainer\Supervisor Name (print)	Apprentice Signature
SKILLS		

U4608.01 ***Plan lifts***, by assessing load characteristics such as size and shape, determining load weight and centre of gravity, and removing obstacles and dangers, using SWL charts, in accordance with government regulations, rigging manuals, manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature

U4608.02 ***Select and use rigging/hoisting equipment***, such as ropes, fibre and wire, slings, thimbles, shackles, spreader bars, chains, hooks, hoists, rope blocks, winches, and jacks, in accordance with government regulations, rigging manuals, manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature

U4608.03 ***Inspect and maintain all rigging/hoisting equipment***, by checking for removal from service criteria, in accordance with government regulations, rigging manuals, manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature

U4608.04 ***Demonstrate standard hand signals and radio signal procedures***, to convey directions and instructions to co-workers and equipment operators, to ensure that rigging/hoisting operations are performed safely.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature

Sponsor Name (print)	**Sponsor Signature**

U4609.0 INSTALL AND MAINTAIN MATERIAL HANDLING SYSTEMS

SKILL SET

Install and maintain belt, roller, bucket, chain, screw and air conveyor systems; install and maintain idlers, take-up units, scrapers, skirting; install and maintain screens, chutes, vibrators; install, align and maintain drive units; inspect and maintain overhead cranes and hoists; splice belts; ensure that installation and maintenance are to prescribed standards.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4609.01 ***Install, align and maintain conveyor systems***, such as belt, roller, bucket, chain, screw and air conveyors, to ensure installation and maintenance are in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.02 ***Install and maintain conveyor components*** such as belts, chains, sprockets, idlers, take-up units, scrapers, skirting and unloading systems, by adjusting and tracking conveyor systems, in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.03 ***Install and maintain conveyor components*** such as chutes, screens and vibrators to manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.04 ***Splice conveyor belts*** by splicing, using methods such as metal fasteners, plate and button fasteners, two plate fasteners, and vulcanizing, in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.0 INSTALL AND MAINTAIN MATERIAL HANDLING SYSTEMS - Cont'd

SKILLS

U4609.05 ***Check tracking at idlers and pulleys after splicing*** or installation according to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.06 ***Inspect and maintain overhead cranes and hoists***, and monorail systems, by checking wheels, trolley system, alignment and tracking, by inspecting hooks, sheaves, wire rope, chains, and brakes, and by load testing and recording data, in accordance with safety legislation and company specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	Sponsor Signature
_____	_____

U4610.0 INSTALL AND MAINTAIN POWER TRANSMISSION SYSTEMS

SKILL SET

Install and maintain power transmission systems; perform trade calculations on horsepower ratios; install and align belts, 'V' belts, chains and pulleys; install align and maintain shafts, speed reducers, gears, brakes, clutches and harmonic drives; install, align and maintain, mechanical, fluid, magnetic and centrifugal couplings; install and maintain cams and followers; use keys, splines and bushings; read engineering and component drawings to ensure installation and maintenance to specifications.

	Trainer\Supervisor Name (print)	Apprentice Name (print)
SKILLS	_____	_____

U4610.01 ***Determine gear ratios, horsepower requirements and final speeds***, by applying trade calculations, using charts and specification data to ensure correct installation and alignment to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4610.02 ***Install, align and maintain power transmission components***, such as flat and timing belts, 'V' belts, pulleys and chains, by calculating belt and chain tension, checking and adjusting alignment after installation to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4610.03 ***Install, align and maintain power transmission components***, such as shafts, speed reducers, gears, brakes, clutches, ball screws, harmonic drives and cams and followers using conventional and special tools and instruments to ensure installation and operation are to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.0 INSTALL AND MAINTAIN MATERIAL HANDLING SYSTEMS - Cont'd

SKILLS

U4609.05 ***Check tracking at idlers and pulleys after splicing*** or installation according to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4609.06 ***Inspect and maintain overhead cranes and hoists***, and monorail systems, by checking wheels, trolley system, alignment and tracking, by inspecting hooks, sheaves, wire rope, chains, and brakes, and by load testing and recording data, in accordance with safety legislation and company specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4610.0 INSTALL AND MAINTAIN POWER TRANSMISSION SYSTEMS

SKILL SET

Install and maintain power transmission systems; perform trade calculations on horsepower ratios; install and align belts, 'V' belts, chains and pulleys; install align and maintain shafts, speed reducers, gears, brakes, clutches and harmonic drives; install, align and maintain, mechanical, fluid, magnetic and centrifugal couplings; install and maintain cams and followers; use keys, splines and bushings; read engineering and component drawings to ensure installation and maintenance to specifications.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4610.01 ***Determine gear ratios, horsepower requirements and final speeds***, by applying trade calculations, using charts and specification data to ensure correct installation and alignment to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4610.02 ***Install, align and maintain power transmission components***, such as flat and timing belts, 'V' belts, pulleys and chains, by calculating belt and chain tension, checking and adjusting alignment after installation to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4610.03 ***Install, align and maintain power transmission components***, such as shafts, speed reducers, gears, brakes, clutches, ball screws, harmonic drives and cams and followers using conventional and special tools and instruments to ensure installation and operation are to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4610.0 INSTALL AND MAINTAIN POWER TRANSMISSION SYSTEMS – Cont.

SKILLS

U4610.04 ***Install, align and maintain couplings***, such as mechanical, magnetic, fluid and centrifugal, using specialized tools to ensure installation and operation are to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4610.05 ***Install and maintain keys, splines, bushes and tapered bushes*** using conventional and specialized tools to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____
	Sponsor Name (print)	**Sponsor Signature**
	_____	_____

U4611.0 INSTALL AND MAINTAIN COMPRESSORS

SKILL SET

Identify type of compressor for specific application; install and maintain rotary and reciprocating compressors; install and maintain primary filters and coolers; install and maintain separators and receivers; install and maintain unloading distribution and lube system; install and maintain dryers, refrigeration desiccant and deliquescent type, in accordance with component drawings and manufacturer's specifications.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4611.01 ***Install and maintain rotary and reciprocating compressors*** by checking orientation and availability of services, air intakes, hydro, water, drainage, ventilation and interfaces, replacing worn or defective intake, discharge, check, unloading, blowdown, bleed and safety valves, oil separator packs, control pressure regulators, pressure switches, thermostatic controls, fusible plugs, inter and after coolers, in accordance with manufacturers specifications, government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.02 ***Install and maintain primary filters and coolers***, by inspecting, replacing or maintaining filter medium, tubes, gaskets, single and multi pass coolers, and heat exchangers, in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.0 INSTALL AND MAINTAIN COMPRESSORS

SKILL SET

Identify type of compressor for specific application; install and maintain rotary and reciprocating compressors; install and maintain primary filters and coolers; install and maintain separators and receivers; install and maintain unloading distribution and lube system; install and maintain dryers, refrigeration desiccant and deliquescent type, in accordance with component drawings and manufacturer's specifications.

Trainer\Supervisor Name (print) _____ Apprentice Name (print) _____

SKILLS

U4611.01 ***Install and maintain rotary and reciprocating compressors*** by checking orientation and availability of services, air intakes, hydro, water, drainage, ventilation and interfaces, replacing worn or defective intake, discharge, check, unloading, blowdown, bleed and safety valves, oil separator packs, control pressure regulators, pressure switches, thermostatic controls, fusible plugs, inter and after coolers, in accordance with manufacturers specifications, government regulations and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.02 ***Install and maintain primary filters and coolers***, by inspecting, replacing or maintaining filter medium, tubes, gaskets, single and multi pass coolers, and heat exchangers, in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.0 INSTALL AND MAINTAIN COMPRESSORS - Cont'd

SKILLS

U4611.03 ***Install and maintain separators and receivers***, by inspecting, replacing or maintaining check, drain, isolating, by-pass and moisture dump valves, pressure gauges, by-pass set-ups and pipe systems, in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.04 ***Install, maintain and repair unloading, distribution and lube systems***, by inspecting, replacing or maintaining unloaders including diaphragms, springs, valves, seals, control linkages and lubrication systems in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.05 ***Install, maintain and inspect dryers and coolers*** by conducting leak tests, purge and recharge systems, by setting up pressure regulators, by troubleshooting using gauges and by caring and storing liquids and gases, in accordance with government regulations, company policy and manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.0 INSTALL AND MAINTAIN COMPRESSORS - Cont'd

SKILLS

U4611.03 ***Install and maintain separators and receivers***, by inspecting, replacing or maintaining check, drain, isolating, by-pass and moisture dump valves, pressure gauges, by-pass set-ups and pipe systems, in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.04 ***Install, maintain and repair unloading, distribution and lube systems***, by inspecting, replacing or maintaining unloaders including diaphragms, springs, valves, seals, control linkages and lubrication systems in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4611.05 ***Install, maintain and inspect dryers and coolers*** by conducting leak tests, purge and recharge systems, by setting up pressure regulators, by troubleshooting using gauges and by caring and storing liquids and gases, in accordance with government regulations, company policy and manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4612.0 INSTALL AND MAINTAIN PUMPS

SKILL SET

Install and maintain hydrodynamic and hydrostatic pumps such as: axial flow, centrifugal, mixed flow, reciprocal, rotary, diaphragm, lobe and liquid ring; install and maintain mechanical seals, packing, bearings and lube systems; in accordance with component drawings and manufacturer's specifications.

	Trainer\Supervisor Name (print)	Apprentice Name (print)
SKILLS	_____	_____

U4612.01 ***Install and maintain hydrodynamic pumps***, such as axial flow, centrifugal and mixed flow pumps, by inspecting, replacing and repairing pumps in accordance with manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4612.02 ***Install, maintain and repair hydrodynamic pump components*** such as impellers, casings, wear rings, shaft, shaft sleaves, packing and seals, by inspecting, replacing components to manufacturer's specifications.

U4612.03 ***Install, maintain and repair hydrostatic pumps***, such as gear, vane, piston, diaphragm and screw, by inspecting, maintaining or replacing to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4612.04 ***Inspect, maintain or repair hydrostatic pump components***, such as vanes, rotors, pistons, cylinders, swash plates, diaphragms and seals, by inspecting, maintaining and replacing components to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

	Sponsor Name (print)	**Sponsor Signature**
	_____	_____

U4613.0 INSTALL, COMMISSION AND MAINTAIN PRIME MOVERS AND MACHINERY

SKILL SET

Prepare site to specifications; lay out and prepare base or foundation; install steam, water or gas turbines, internal combustion engines, electric motors or generators; level and align machinery and components; secure using anchors, bolts, fasteners and grouting; torque and tension fasteners; conduct final checks; start-up and run-in; record footprint/signature; maintain steam, water or gas turbines, internal combustion engines, electric motors and generators to manufacturer's specifications and standards.

Trainer\Supervisor Name (print) _____ Apprentice Name(print) _____

SKILLS

U4613.01 ***Lay out and prepare base or foundation*** by locating centre and datum lines, reference points and bench marks; by selecting and installing chemical and expanding anchors; and by rechecking base or foundation dimensions and bolt locations ensuring they are in accordance with drawings, plans, job specification and company policy.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4613.02 ***Install prime movers***, using safe rigging and moving procedures to position on base, ensuring base and feet are free from dirt and burrs, maintaining coupling gap as per specifications, and by checking component alignment, in accordance with manufacturer's specifications, engineered drawings and company policy.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4613.03 ***Level and align machinery***, by checking for soft foot using methods such as computer, laser, optical, reverse dial or piano wire alignment methods, checking and adjusting pipe strain, by allowing for thermal growth and leveling base or components using shims, jacks, bolts, wedges, pads and hydraulic jacks, in accordance with manufacturer's specifications, engineered drawings and company policy.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4613.0 INSTALL, COMMISSION AND MAINTAIN PRIME MOVERS AND MACHINERY - Cont'd

SKILLS

U4613.04 ***Secure machinery***, using anchors, bolts, fasteners, grouting and epoxy resins to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.05 ***Conduct final checks on prime movers and machinery*** checking that all service lines are clear, by inspecting and adjusting auxiliary oil systems and cooling water to ensure proper operation, detecting and repairing leaks, ensuring that safety devices, relief valves and lock-outs are installed and operating properly, and by blowing down and priming the system in accordance with manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.06 ***Startup prime mover and ancillary equipment*** and run-in adhering to manufacturer's specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.07 ***Record footprint/signature of machinery***, by using vibration instruments and record readings.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.0 INSTALL, COMMISSION AND MAINTAIN PRIME MOVERS AND MACHINERY - Cont'd

SKILLS

U4613.04 ***Secure machinery***, using anchors, bolts, fasteners, grouting and epoxy resins to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.05 ***Conduct final checks on prime movers and machinery*** checking that all service lines are clear, by inspecting and adjusting auxiliary oil systems and cooling water to ensure proper operation, detecting and repairing leaks, ensuring that safety devices, relief valves and lock-outs are installed and operating properly, and by blowing down and priming the system in accordance with manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.06 ***Startup prime mover and ancillary equipment*** and run-in adhering to manufacturer's specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.07 ***Record footprint/signature of machinery***, by using vibration instruments and record readings.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4613.0 INSTALL, COMMISSION AND MAINTAIN PRIME MOVERS AND MACHINERY - Cont'd

SKILLS

U4613.08 ***Maintain and repair internal combustion, electrical and\or turbines*** by: installing mechanical, hydraulic and electronic governors; by maintaining internal and auxiliary oil systems, balancing critical rotating parts, by repairing and/or replacing intake and exhaust valves and seats, steam, gas and motor turbine inlet valves and overspeed trip valves; by inspecting and maintaining fuel systems, filters, pumps, injectors, remote start systems including batteries and air receivers, starters and alternators, mating surfaces for warpage, steam cuts, burring and bruising, cylinder bores and liners; and by adjusting intake and exhaust valves and timing assembly, in accordance with manufacturer's specifications, schematics and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____
	Sponsor Name (print)	**Sponsor Signature**
	_____	_____

U4614.0 WELD, BRAZE AND SOLDER

SKILL SET

Set up and operate welding equipment, including arc, metal inert gas (MIG), tungsten inert gas (TIG), and plasma; set up and operate gas welding equipment; braze and solder; read and interpret welding symbols; select and use non-metallic welding rods; lay out, fabricate and tack to specifications; set-up and operate spray welding equipment; work to be visually inspected and to specifications.

Trainer\Supervisor Name (print) Apprentice Name(print)

SKILLS _____ _____

U4614.01 ***Set up and operate electric welding equipment*** such as SMAW, MIG and TIG, to prepare, assemble and weld materials in position, using the electrode to produce welds to pass visual inspection.

Date Completed Trainer\Supervisor Signature Apprentice Signature

_____ _____ _____

U4614.02 ***Set up and operate gas welding and cutting equipment***, such as oxcetylene, plasma, and spray welding, to produce clean cuts free from slag and heat distortion, completing welding, brazing and soldering operations to pass visual inspection.

Date Completed Trainer\Supervisor Signature Apprentice Signature

_____ _____ _____

U4614.03 ***Read, interpret and apply all applicable welding symbols*** and instructions, using drawings.

Date Completed Trainer\Supervisor Signature Apprentice Signature

_____ _____ _____

U4614.04 ***Lay out, tack and fabricate materials*** to assemble components and minimize weld distortion during welding operation, using drawings.

Date Completed Trainer\Supervisor Signature Apprentice Signature

_____ _____ _____

Sponsor Name (print) Sponsor Signature

_____ _____

U4615.0 INSTALL AND MAINTAIN BEARINGS, SEALS AND PACKING

SKILL SET

Identify and apply bearing materials, fits and tolerances; fit and maintain plain, journal, sleeve, radial and axial bearings; install and maintain bearing housings; fit and maintain anti-friction axial, radial, ball, roller, needle, taper and spherical bearings; inspect and lubricate bearings; fit and maintain gasket, labyrinth, and mechanical seals; fit and maintain 'O' ring and lip seals; apply chemical sealants; select, install and remove packing; ensure that maintenance and installation procedures are to prescribed standards.

	Trainer\Supervisor Name (print)	Apprentice Name(print)
SKILLS	_____	_____

U4615.01 ***Select, install and maintain plain and journal bearings***, such as sleeve, radial and axial; by methods such as bluing and scraping babbitt and bronze bearings, machining to fit nylon and teflon bearings, and checking clearances to tolerances required by manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4615.02 ***Install and maintain bearing housings***; by selecting type of housing for specific application including, floating, pillow, flange and split, installing using shims as required to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4615.03 ***Select, install and maintain bearings***, such as anti-friction, radial, axial, ball, roller, taper, spherical, self aligning, linear, needle and split bearings; using equipment such as bearing ovens, induction heaters, demag units, hot oil baths, arbor press, pullers and hydraulic jack sets as required to manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4615.0 INSTALL AND MAINTAIN BEARINGS, SEALS AND PACKING - Cont'd

SKILLS

U4615.04 ***Inspect bearings***, by checking for wear and clearances, and other defects such as spalling, brinnelling, scoring and cracks, in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4615.05 ***Install static, dynamic and rotary seals***, such as gaskets, 'O' rings, labyrinth seals, magnetic bearing housing seals, mechanical seals and dry gas seals, in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4615.06 ***Select and apply chemical sealants*** including liquid gasket materials, plastic or liquid metal fillers for static or dynamic conditions in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4615.07 ***Select, install and remove packing*** for specific applications; by measuring and cutting packing as required and install safely without damage to other components, in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4616.0 INSTALL AND MAINTAIN FANS AND BLOWERS

SKILL SET

Install single and multi-stage fan and blower systems such as, centrifugal, axial and propeller fans; fans systems; dust collection and related systems; inspect and maintain control systems.

	Trainer\Supervisor Name (print)	Apprentice Name(print)
	_____	_____

SKILLS

U4616.01 *Install and maintain single and multi-stage fan and blower systems*, such as axial, centrifugal and propeller types, for ventilation, material handling, wet and dry dust collection, induced forced and balanced draft, and cooling tower applications, ensuring correct driver and alignment installation to prescribed standards and drawings.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4616.02 ***Inspect, maintain and troubleshoot single and multi-stage fan and blower components***, by checking wheel and impeller clearances and balance; by maintaining oil, lubrication, and bearing cooling systems, by inspecting and replacing worn bearings, filter and shaker systems; by maintaining pedestals or mountings, in accordance to manufacturers specifications and government regulations.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4616.03 ***Troubleshoot and balance air flow in the system***, by using capacity and demand factors, and methods such as visual inspection, air flow indicators and vibration analysis, in accordance with manufacturers specifications, and government regulations.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4616.0 INSTALL AND MAINTAIN FANS AND BLOWERS ....cont.

SKILLS

U4616.04 ***Troubleshoot, inspect and replace worn or defective controls***, such as, electrical\electronic, pneumatic and thermal louvre linkages, by inspecting and maintaining solenoid controls, air flow indicators, vacuum and pressure gauges in accordance with manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4617.0 INSTALL AND MAINTAIN PNEUMATIC SYSTEMS

SKILL SET

Apply pneumatic principles and safety procedures; fit and maintain pressure, direction and flow control valves; install and maintain tubing, piping and hoses; install and maintain regulators, filters and oilers; install and maintain linear and rotary actuators; install and maintain electric and electronic proportional logic controls; read and interpret schematic symbols; troubleshoot pneumatic systems; apply trade calculations and formulas; ensure that installation and maintenance procedures are to prescribed standards and specifications.

Trainer\Supervisor Name (print) _____ Apprentice Name(print) _____

SKILLS

U4617.01 ***Apply pneumatic principles*** such as force, weight, mass, pressure and energy in the installation and maintenance of pneumatic systems, by using Boyle's Law and Charles' Law as they apply to pneumatic theory, practising all safety procedures when working on pneumatic systems.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4617.02 ***Calculate and apply piston areas, forces, pressures and related fluid power formulae*** and trade maintenance calculations.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4617.03 ***Install and maintain pressure control valves***, such as spool or poppet types for relief, sequence or unloading operations, directional valves including sliding spool, poppet or rotary types, by using and applying proper port configurations and varied controls such as manual, mechanical, electrical and pilot; installing flow control valves in proper location, metering in and out, and by compensating for pressure and temperature variations, in accordance with manufacturers specifications.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4617.04 ***Install and maintain regulators***, by adjusting pressure; filters allowing for drainage of moisture; lubricators, using oils and adjusting oil feeds, in accordance to manufacturers specifications.

Date Completed _____ Trainer\Supervisor Signature _____ Apprentice Signature _____

U4617.0 INSTALL AND MAINTAIN PNEUMATIC SYSTEMS - Cont'd

SKILLS

U4617.05 ***Lay out, install and maintain tubing, piping and hoses***; by sizing and bending, installing compression fittings, threading and hanging pipe and tubing, and installing hose clamps, fittings, brackets, expansion joints and insulation, in accordance with manufacturer's specifications and drawings.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4617.06 ***Install and maintain linear and rotary actuators***, such as single and double acting, single and double rod types; seals and packing, cup seals and 'O' rings, piston motors, vane motors, gear motors, lobe and diaphragm, in accordance to manufacturer's specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4617.07 ***Set up and adjust variable proportional control valves***, such as direction, flow and pressure types, by inspecting and adjusting electronic controls including potentiometers and proximity switches, in accordance with manufacturer's specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4617.08 ***Troubleshoot pneumatic systems*** including electrical\electronic controls, following logical sequence of elimination, and using appropriate test instruments and equipment to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4618.0 INSTALL AND MAINTAIN HYDRAULIC SYSTEMS

SKILL SET

Apply hydraulic principles and safety procedures; hydraulic fluids, types and applications; install and maintain power units, pump filters, accumulators and heat exchangers; install and maintain filters, strainers and contamination controls; install and maintain fluid conductors, pipe, tubing, hosing and associated fittings; fit and maintain pressure direction and flow control valves; read and interpret schematics and symbols; install and maintain linear and rotary actuators; install and maintain electric and electronic servo-proportional logic controls; apply trade calculations and formulas; install and maintain systems to specifications.

	Trainer\Supervisor Name (print)	Apprentice Name(print)
SKILLS	_____	_____

U4618.01 ***Apply hydraulic principles*** such as force, pressure energy, friction, volume and velocity, in the installation and maintenance of hydraulic systems; by using Pascals Law and Bernoulli's Principle as they apply to hydraulic theory; and by practising safety procedures when installing and maintaining hydraulic systems.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.02 ***Apply trade calculations and formulas*** to the solving of pressure, force, flow rate and conductor size problems in the installation and maintenance of hydraulic systems.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.03 ***Identify, select and use hydraulic fluids***, such as petroleum based, fire resistant and synthetic, for specific applications, inspecting and replacing fluid when required.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.0 INSTALL AND MAINTAIN HYDRAULIC SYSTEMS - Cont'd

SKILLS

U4618.04 ***Install, start up, maintain and repair various types of power units and associated hydraulic circuitry***, ensuring air is bled from the system, in accordance to manufacturer's specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.05 ***Install and maintain filters, strainers and related contamination control equipment*** to ensure a clean, contamination-free hydraulic system, in accordance to manufacturer's specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.06 ***Install and maintain fluid conductors***, such as piping, tubing, hosing, fittings, brackets, expansion joints and insulation, by inspecting and replacing worn or defective components to ensure an efficient, leakproof and clean hydraulic system, in accordance with manufacturers specifications and company policy.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.07 ***Install, maintain and repair pressure, direction and flow control valves*** to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.08 ***Install and maintain hydraulic linear and rotary actuators*** to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.0 INSTALL AND MAINTAIN HYDRAULIC SYSTEMS - Cont'd

SKILLS

U4618.09 ***Set up, maintain and adjust logic servo-proportional control systems***, to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4618.10 ***Troubleshoot hydraulic systems***, by following logical sequence of elimination, using appropriate test instruments and equipment to manufacturer's specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

U4619.0 PERFORM PREVENTIVE AND PREDICTIVE MAINTENANCE

SKILL SET

Use vibration analysis and balancing equipment; use non-destructive test equipment; use computer to manage and schedule preventive and predictive maintenance; use noise monitoring instruments; use temperature, pressure and fibre optic instruments, to reduce incidence of equipment failure and to schedule routine maintenance to manufacturer's specifications.

	Trainer\Supervisor Name (print)	Apprentice Name(print)
SKILLS		

U4619.01 ***Use and maintain fixed and portable vibration and balancing equipment***, by reading and interpreting monitors for velocity, frequency and amplitude, establishing and recording footprint/signature of machinery.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature

U4619.02 ***Select and use various types of non-destructive test equipment***, such as dye penetrant, magnaflux, ultrasonic, fluoroscopic and used oil analysis, in accordance with manufacturer's specifications and government regulations.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature

U4619.0 PERFORM PREVENTIVE AND PREDICTIVE MAINTENANCE

SKILL SET

Use vibration analysis and balancing equipment; use non-destructive test equipment; use computer to manage and schedule preventive and predictive maintenance; use noise monitoring instruments; use temperature, pressure and fibre optic instruments, to reduce incidence of equipment failure and to schedule routine maintenance to manufacturer's specifications.

Trainer\Supervisor Name (print) _____ Apprentice Name(print) _____

SKILLS

U4619.01 ***Use and maintain fixed and portable vibration and balancing equipment***, by reading and interpreting monitors for velocity, frequency and amplitude, establishing and recording footprint/signature of machinery.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4619.02 ***Select and use various types of non-destructive test equipment***, such as dye penetrant, magnaflux, ultrasonic, fluoroscopic and used oil analysis, in accordance with manufacturer's specifications and government regulations.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4619.0 PERFORM PREVENTIVE AND PREDICTIVE MAINTENANCE - Cont'd

SKILLS

U4619.03 ***Use computer and maintenance software packages*** to administer, record, schedule and monitor predictive and preventive maintenance activities to manufacturer's specifications and company standards.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4619.04 ***Use and maintain noisemonitoring instruments*** to determine and prevent potential mechanical, electrical and fluid power failure.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4619.05 ***Use and maintain temperature, pressure, and fibre optic monitoring instruments***, such as pressure gauges, bourdon tube gauges, electronic gauges, bi-metal and mercury gauges; by using and maintaining fibre optic and infra-red instruments to inspect and replace worn or defective components, and by using and calibrating precision testing instruments and equipment to prescribed standards and manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

AREAS OF COMPETENCY

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COMPETENCY ANALYSIS PROFILE
INDUSTRIAL MECHANIC (MILLWRIGHT)
ON-THE-JOB TRAINING STANDARDS

←SKILLS→

PROTECT SELF AND OTHERS U4600.0	Comply with all safety legislation, government regulations and company policies U4600.01	Apply all machinery and equipment lock-out and de-energizing procedures U4600.02	Wear safety clothing and equipment U4600.03	Comply with established confined space safety procedures U4600.04	Apply basic first aid U4600.05
	Preventfires U4600.06	Report all hazards and accidents U4600.07	Perform all work in compliance with company safety and housekeeping standards U4600.08	Apply correct body mechanics U4600.09	
COMMUNICATE U4601.0	Liaise and communicate with fellow workers, company representatives U4601.01	Write overall maintenance and job specific reports U4601.02	**Use computer and job specific maintenance software packages** U4601.03	**Write technical reports, paying particular attention where required, to environmental hazard procedures and regulations** U4601.0U4	
READ DRAWINGS AND SCHEMATICS U4602.0	Read and interpret engineering, machine and component drawings U4602.01	**Draw assembly and component parts** U4602.02	Read and interpret reports, technical and manufacturer's manuals U4602.03	Read and interpret schematics and diagrams U4602.04	Sketch (free hand) assembly and component parts U4602.05
HAND AND POWER TOOLS U4603.0	Use sockets, spanners, wrenches, torque multipliers, manual and/or hydraulic torque U4603.01	Use screwdrivers, chisels, hammers, punches, pliers, levers, scrapers and pry bars U4603.02	Use files, hand saws, drills, power sanders and chippers, reamers, taps, tapping chucks, dies and snips U4603.03	Use tapes, rules, plumb bob and squares U4603.04	Use shears, magnetic base drills, grinders and hand millers U4603.05
	Use power saws, impact tools,, and/or powder actuated tools safely U4603.06				
SET UP AND USE MACHINE TOOLS U4604.0	Read and apply feed, thread cutting, drill and tap chart information U4604.01	Apply specific trade calculations and formulas U4604.02	Set up and operate pedestal and radial drilling machines U4604.03	Set up and operate cut-off band saws U4604.04	**Set up and perform lathe operations** U4604.05

U4619.0 PERFORM PREVENTIVE AND PREDICTIVE MAINTENANCE - Cont'd

SKILLS

U4619.03 ***Use computer and maintenance software packages*** to administer, record, schedule and monitor predictive and preventive maintenance activities to manufacturer's specifications and company standards.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4619.04 ***Use and maintain noisemonitoring instruments*** to determine and prevent potential mechanical, electrical and fluid power failure.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

U4619.05 ***Use and maintain temperature, pressure, and fibre optic monitoring instruments***, such as pressure gauges, bourdon tube gauges, electronic gauges, bi-metal and mercury gauges; by using and maintaining fibre optic and infra-red instruments to inspect and replace worn or defective components, and by using and calibrating precision testing instruments and equipment to prescribed standards and manufacturers specifications.

Date Completed	Trainer\Supervisor Signature	Apprentice Signature
_____	_____	_____

Sponsor Name (print)	**Sponsor Signature**
_____	_____

AREAS OF COMPETENCY

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COMPETENCY ANALYSIS PROFILE
INDUSTRIAL MECHANIC (MILLWRIGHT)
ON-THE-JOB TRAINING STANDARDS

←SKILLS→

PROTECT SELF AND OTHERS **U4600.0**	Comply with all safety legislation, government regulations and company policies U4600.01	Apply all machinery and equipment lock-out and de-energizing procedures U4600.02	Wear safety clothing and equipment U4600.03	Comply with established confined space safety procedures U4600.04	Apply basic first aid U4600.05
	Preventfires U4600.06	Report all hazards and accidents U4600.07	Perform all work in compliance with company safety and housekeeping standards U4600.08	Apply correct body mechanics U4600.09	
COMMUNICATE **U4601.0**	Liaise and communicate with fellow workers, company representatives U4601.01	Write overall maintenance and job specific reports U4601.02	**Use computer and job specific maintenance software packages** **U4601.03**	**Write technical reports, paying particular attention where required, to environmental hazard procedures and regulations** **U4601.0U4**	
READ DRAWINGS AND SCHEMATICS **U4602.0**	Read and interpret engineering, machine and component drawings U4602.01	**Draw assembly and component parts** **U4602.02**	Read and interpret reports, technical and manufacturer's manuals U4602.03	Read and interpret schematics and diagrams U4602.04	Sketch (free hand) assembly and component parts U4602.05
HAND AND POWER TOOLS **U4603.0**	Use sockets, spanners, wrenches, torque multipliers, manual and/or hydraulic torque U4603.01	Use screwdrivers, chisels, hammers, punches, pliers, levers, scrapers and pry bars U4603.02	Use files, hand saws, drills, power sanders and chippers, reamers, taps, tapping chucks, dies and snips U4603.03	Use tapes, rules, plumb bob and squares U4603.04	Use shears, magnetic base drills, grinders and hand millers U4603.05
	Use power saws, impact tools,, and/or powder actuated tools safely U4603.06				
SET UP AND USE MACHINE TOOLS **U4604.0**	Read and apply feed, thread cutting, drill and tap chart information U4604.01	Apply specific trade calculations and formulas U4604.02	Set up and operate pedestal and radial drilling machines U4604.03	Set up and operate cut-off band saws U4604.04	**Set up and perform lathe operations** **U4604.05**

AREAS OF COMPETENCY

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COMPETENCY ANALYSIS PROFILE
INDUSTRIAL MECHANIC (MILLWRIGHT)
ON-THE-JOB TRAINING STANDARDS
←SKILLS→

SET UP AND USE MACHINE TOOLS - Cont'd **4604.0**	Set up and perform milling operations U4604.06	Set up and operate machine tool accessories U4604.07			
USE AND CARE OF PRECISION MEASURING EQUIPMENT **U4605.0**	Use and care of internal and external micrometers U4605.01	Use and care of vernier U4605.02	Use and care of dial indicators and computer dials U4605.03	Use and care of V-blocks, gauge blocks and surface plates U4605.04	Care and set up of machine optical levels U4605.05
	Use and care of laser alignment equipment U4605.06	Use measuring and testing instruments and equipment U4606.07	Define bench marks and turning point U4606.08		
SELECT AND USE MATERIALS AND FASTENERS **U4606.0**	Identify and use ferrous, non-ferrous and specialty alloy materials U4606.01	Select and use non-metallic materials U4606.02	Identify, select and apply screw thread system U4606.03	Identify, select and use fastening devices U4606.04	Use furnace, flame or oven to heat treat metal and alloys U4606.05
	Stress relieve steel U4606.06				
SELECT AND APPLY LUBRICANTS **U4607.0**	Identify characteristics and composition of various lubricants U4607.01	Select and use specific oils and greases U4607.02	Identify, select and use special purpose lubricants U4607.03	Install, maintain and repair machinery and plant lubrication systems U4607.04	Handle and store all lubricants and greases safely U4607.05
RIG AND HOISTS **U4608.0**	Plan lifts U4608.01	Select and use rigging/hoisting equipment U4608.02	Inspect and maintain all rigging/hoisting equipment U4608.03	Demonstrate standard hand signals and radio signal procedures U4608.04	

AREAS OF COMPETENCY

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COMPETENCY ANALYSIS PROFILE
INDUSTRIAL MECHANIC (MILLWRIGHT)
ON-THE-JOB TRAINING STANDARDS
←SKILLS→

WELD, BRAZE AND SOLDER **U4614.0**	Set up and operate electric welding equipment U4614.01	Set up and operate gas welding and cutting equipment U4614.02	Read, interpret and apply all applicable welding symbols U4614.03	Lay out, tack and fabricate materials U4614.04	
INSTALL AND MAINTAIN BEARINGS, SEALS AND PACKING **U4615.0**	Select, install and maintain plain and journal bearings U4615.01	Install and maintain bearing housings U4615.02	Select, install and maintain bearings U4615.03	Inspect bearings U4615.04	Install static, dynamic and rotary seals U4615.05
	Select and apply chemical sealants U4615.06	Select, install and remove packing U4615.07			
INSTALL AND MAINTAIN FANS AND BLOWERS **U4616.0**	Install and maintain single and multi-stage fan and blower systems U4616.01	Inspect, maintain and troubleshoot single and multi-stage fans and blower components U4616.02	Troubleshoot and balance air flow in the system U4616.03	Troubleshoot, inspect and replace worn or defective controls U4616.03	
INSTALL AND MAINTAIN PNEUMATIC SYSTEMS **U4617.0**	Apply pneumatic principles U4617.01	Calculate and apply piston areas, forces, pressures and related fluid power formulas U4617.02	Install and maintain pressure control valves U4617.03	Install and maintain regulators U4617.04	Lay out, install and maintain tubing, piping and hoses U4617.05
	Install and maintain linear and rotary actuators U4617.06	Set up and adjust variable proportional control valves U4617.07	Troubleshoot pneumatic systems U4617.08		

COMPETENCY ANALYSIS PROFILE
INDUSTRIAL MECHANIC (MILLWRIGHT)
ON-THE-JOB TRAINING STANDARDS
-SKILLS-

AREAS OF COMPETENCY ↓					
INSTALL AND MAINTAIN MATERIAL HANDLING SYSTEMS **U4609.0**	Install, align and maintain conveyor systems U4609.01	Install and maintain conveyor components U4609.02	Install and maintain conveyor components U4609.03	Splice conveyor belts U4609.04	Check tracking at idlers and pulleys after splicing U4609.05
	Inspect and maintain overhead cranes and hoists U4609.06				
INSTALL AND MAINTAIN POWER TRANSMISSION SYSTEMS **U4610.0**	Determine gear ratios, horsepower requirements and final speeds U4610.01	Install, align and maintain power transmission components U4610.02	Install, align and maintain power transmission components U4610.03	Install, align and maintain couplings U4610.04	Install and maintain keys, splines, bushes and tapered bushes U4610.05
INSTALL AND MAINTAIN COMPRESSORS **U4611.0**	Install and maintain rotary and reciprocating compressors U4611.01	Install and maintain primary filters and coolers U4611.02	Install and maintain separators and receivers U4611.03	Install, maintain and repair unloading, distribution and lube systems U4611.04	Install, maintain and inspect dryers and coolers U4611.05
INSTALL AND MAINTAIN PUMPS **U4612.0**	Install and maintain hydrodynamic pumps U4612.01	Install, maintain and repair hydrodynamic pump components U4612.02	Install, maintain and repair hydrostatic pumps U4612.03	Inspect, maintain repair hydrostatic pump components U4612.04	
INSTALL, COMMISSION AND MAINTAIN PRIME MOVERS AND MACHINERY **U4613.0**	Lay out and prepare base or foundation U4613.01	Install prime movers U4613.02	Level and align machinery U4613.03	Secure machinery U4613.04	Conduct final checks on prime movers and machinery U4613.05
	Startup prime mover and ancillary equipment U4613.06	Record footprint/signature of machinery U4613.07	Maintain and repair internal combustion, electrical and/or turbines U4613.08		

AREAS OF COMPETENCY

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COMPETENCY ANALYSIS PROFILE
INDUSTRIAL MECHANIC (MILLWRIGHT)
ON-THE-JOB TRAINING STANDARDS
←SKILLS→

INSTALL AND MAINTAIN HYDRAULIC SYSTEMS **U4618.0**	Apply hydraulic principles U4618.0	Apply trade calculations and formaulas U4618.02	Identify, select and use hydraulic fluids U4618.03	Install, start up, maintain and repair various types of power units and associated hydraulic circuitry U4618.04	Install and maintain filters, strainers and related contiamination control equipment
	Install and maintain fluid conductors	Install, maintain and repair pressure, direction and flow control valves U4618.07	Install and maintain hydrraulic linear and rotary actuators U4618.08	Set up, maintain and adjust logic servo-proportional control systems U4618.09	Troubleshoot hydraulic systems U4618.10
PERFORM PREVENTIVE AND PREDICTIVE MAINTENANCE **U4619.0**	Use and maintain fixed and portable vibration and balancing equipment	Select and use various types of non-destructive test equipment U4619.02	Use computer and maintenance software packages U4619.03	Use and maintain noise monitoring instruments U4619.04	Use and maintain temperature, pressure and fibre optic monitoring instruments U4619.05